

Fishes

DIVISION OF FISHES
U. S. NATIONAL MUSEUM



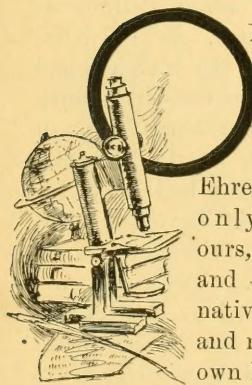
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CHRISTIAN GOTTFRIED
EHRENBURG.



NE of the most prominent naturalists that the nineteenth century has produced was C. G. Ehrenberg. He was not only a countryman of ours, but he was also born and raised in our own native town, Delitzsch, and reminiscences of our own happy childhood are connected with the name of Ehrenberg. His father's and our grandfather's gardens adjoined each other, being separated by a small hedge only.

When yet a small schoolboy, our interest in Natural History was such that every spare hour was spent in grandfather's large garden, hunting butterflies, beetles and caterpillars, or fishing all kinds of living creatures out of the moats that surrounded the castle and the walls of the town. The professor, who frequently visited the old home-stead, would take much pleasure in enlightening us on the various objects

that fell prey to us, and gave us the first practical instruction for their preparation or care.

It is the one hundredth anniversary of his birth that caused this sketch to be written of a man who was shortly before his death honored by the Leeuwenhoek medal, and proclaimed by the Academy of Science of Amsterdam the most eminent microscopist alive; for he was also famous as a botanist and zoölogist, taking great interest in the aquarium.

C. G. Ehrenberg was born April 19, 1795, in Delitzsch, a small town near Leipsic (Germany). His father held the office of recorder of the Lutheran-Evangelical diocese in that town. The duties of his office brought him in close contact with the pastors of the various churches. Many of these gentlemen were noted for their love of natural history, and especially one of them, the pastor of the nearby Count Hohenthal estate, "Doebernitz," was a great botanist, who went so far in his enthusiasm as to form a small class of five or six young boys for the study of this branch of science.

Ehrenberg was among these pupils. His craving for knowledge, and ability

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to learn, caused his father to yield to his desire for a higher school education. Delitzsch owns three free scholarships at the famous cloister school Pforta. This school is not far from Delitzsch, in beautiful Thüringen. One of the scholarships Ehrenberg succeeded in securing, a privilege representing about five hundred dollars a year. In later years, when he had reached the height of his fame, he often spoke gratefully of his native town, acknowledging that without the aid of the Delitzsch scholarship his career would have been impossible.

After six years young Ehrenberg was graduated with honors, and although his taste was decidedly in favor of natural history, complying with the wish of his father, he studied theology at the University of Leipsic. Having completed his studies, his first sermon convinced his father that he would not be a success as a preacher, and he now willingly gave his permission for the study of medicine.

Delitzsch having at the close of the Napoleonic war, 1815, become a Prussian possession, Ehrenberg's military duties compelled him to stop his studies at Leipsic and continue them at the Royal University at Berlin. Three years later he passed examination and received his grade as M.D.

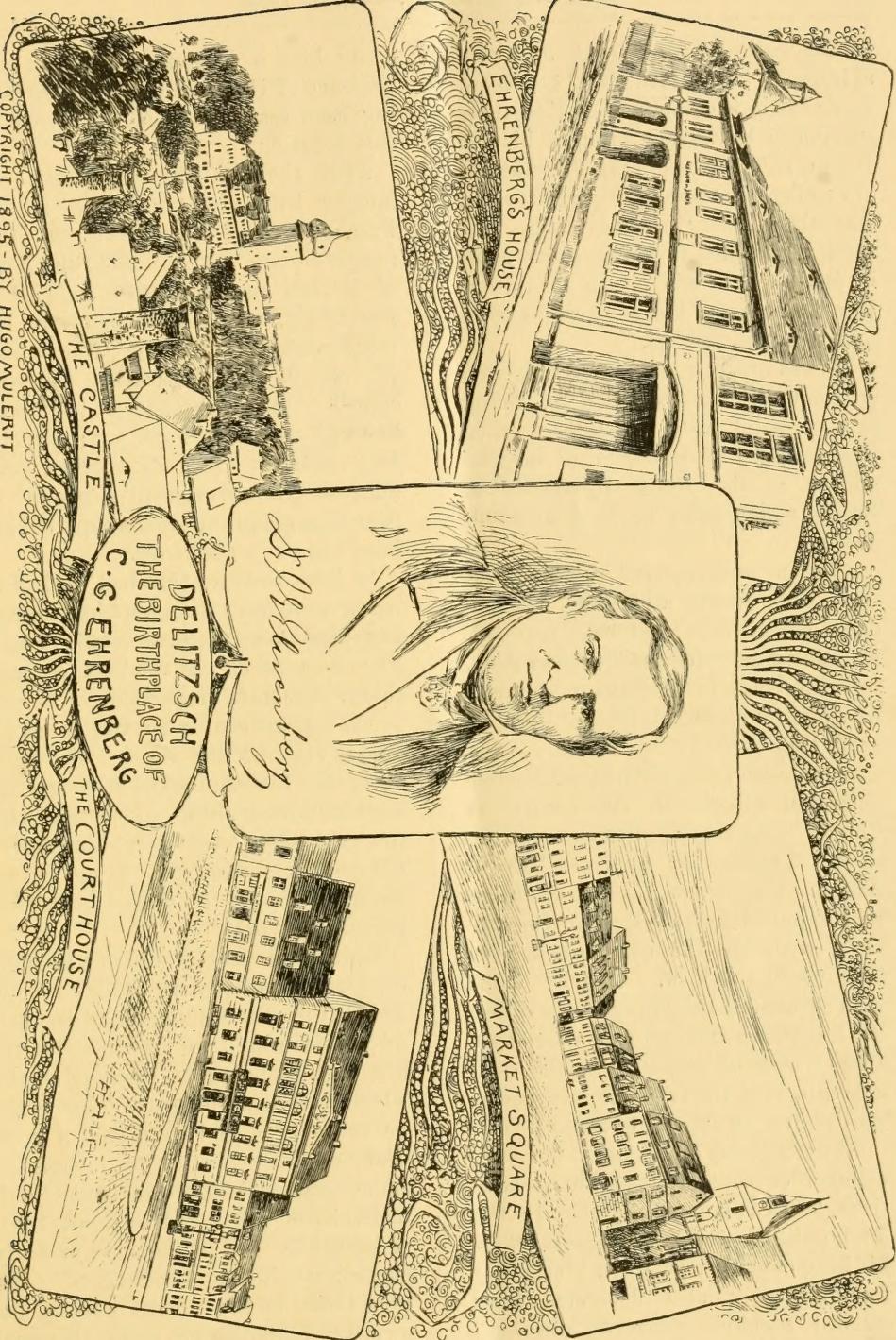
His father expected that Gottfried would now return to his native town, settle down and devote himself to the practice of medicine. But fate directed differently. His essay, written in the most perfect Latin, on the development of moulds and fungi, showed so much originality of thought that it attracted the attention of the Royal Academy. They found him useful, and two years later he started with his intimate friend, Hemprich, likewise an M. D. and instructor of Zoölogy at the Mili-

tary Academy, on an expedition to Africa at the expense of the Prussian Government.

For nearly six years these two young scientists studied the flora and fauna of the Desert, the upper Nile, Mount Sinai, Lebanon, the Red Sea and Abyssinia. The narrative, as told in Ehrenberg's diary and printed in Dr. Max Laue's biography of Ehrenberg, which work we have before us while writing this sketch, reads like fiction. No railroads nor steamers being then in existence, the long journey from Berlin to Triest had to be made in wagons; a sailing vessel carried them to Alexandria. From there on they traveled on the backs of camels, of which their caravan possessed sixteen, or on Nile-boats. We read that the travelers had been left a long time without money and even letters from home, through the treacherous act of the Prussian consul at Triest, who had used for himself the money sent for them, withholding at the same time all correspondence both ways. Twice our travelers were surrounded by the terrible plague; a war on the desert caused them at another time to retreat to Cairo, while tropical fevers reduced their number.

Nine of the party had already found their graves on the border of the Nile or in the sand of the desert, and when, while in Abyssinia, Dr. Hemprich also died of tropic fever in the arms of Ehrenberg, then the expedition turned homeward.

The result of this voyage was 34,000 specimens, representing 135 species of mammals, 430 of birds, 546 of fish and amphibians, 600 annelides and crustacea and 2,000 species of insects, 300 specimens of minerals, and botanical specimens without number. This col-



lection, having been shipped to Berlin at intervals as collected, filled 114 boxes, each of 20 to 30 cubic feet. Besides these specimens Ehrenberg brought his and Hemprich's diaries and many thousands of excellent sketches, nearly all in colors, Ehrenberg being a fine artist. All these were added to the royal museums in Berlin. On his return to Europe Ehrenberg found himself a well-known man ; in fact, famous.

He was liberally rewarded by his Government with honors and a nice round sum of solid cash. Besides this, he was installed as professor of medical science at the Royal University of Berlin, which chair he held until his death.

After a well-deserved rest of about two years, during which his broken-down constitution had been restored, Ehrenberg accepted an offer from Alex. von Humboldt to accompany him on a voyage through Asiatic Russia. In April, 1829, they started from Berlin. Their trip extended through the Ural Mountains and Siberia to the borders of China. This trip was just the contrary to that experienced by Ehrenberg in Africa. The famous German scientists were supplied by the Russian Government with all the conveniences the Czar could think of. Heavily laden with specimens belonging to the different kingdoms, among which were about 1,000 species of plants and many valuable minerals, the travelers returned to Berlin after an absence of about a year.

Ehrenberg was a member or honorary member of seventy scientific associations, located all over the globe. He was distinguished with the highest order his king could bestow upon him; many foreign rulers also decorated him; learned societies awarded him high medals, and the University of Oxford

made him a Master of Arts in the presence of the Queen, Ehrenberg having been seated next to the throne on this occasion.

After the death of his friend, the famous Humboldt, the Académie de France elected Ehrenberg in the former's place. About 1859, the King of Prussia had a picture painted of Ehrenberg, which now hangs in the Hohenzollern Gallery and from which the one in our illustration has been copied. But Ehrenberg has been honored in other ways yet: twenty-four animals, fifty-six plants, one mineral (Ehrenbergite), a group of islands, a mountain and a cape having been named in his honor.

In 1865, the eyes that had worked so much gave out ; a cataract had formed and Ehrenberg became totally blind. For two years he was unable to see anything. A successful operation performed by the famous oculist Dr. Graefe, at his clinic, restored the sight. He could again see his family and friends. He used his eyes again in connection with the microscope, but very cautiously ; his youngest daughter, being his assistant, attended to the most straining part of the work.

Ehrenberg was the type of a German scientist : seemingly slow, but thorough. Aside from the thousand and one new discoveries which he has made in the different branches of science, among which were some of great importance, he has written and published a great deal and his collection of microscope slides numbered 39,000 analyses of animals, 1,000 geological sections, 1,000 of infusoriae. All of these are properly named, classified and catalogued. Besides these, he left illustrations by his own hand numbering many thousand sheets, some of them containing from

twenty to forty illustrations; a great many specimens of soils, dredgings and minerals from all parts of the globe. This entire collection, together with the microscope Ehrenberg had in constant and exclusive use since 1832, was bought by the Prussian Government and delivered personally by Ehrenberg in May, 1876. June 27, 1876, he died and was buried at Berlin. His grave is marked by a plain obelisk that shows in front his bust in bass-relief, and in the rear the motto which he had selected in connection with his doctor essay :

Der Welten Kleines auch ist wunderbar
und gross,
Und aus dem Kleinen bauen sich
die Welten.

A COLONY OF YOUNG FROGS ON THE PARENTAL BACK.

The remarkable habits of some tropical frogs that nurse their young, as it were, by carrying them about on their backs, are described in *Knowledge* (May 1), by Mr. R. Lydekker, in an article from which we quote below :

" So far back as the year 1705, Fraulein Sibylla von Merian, in a work on the reptiles of Surinam, described a remarkable toad-like creature, in which the young are carried in a series of cells in the thick skin of the back of the female, which at this period has a honeycomb-like appearance. Till last year, when living examples were received by the London Zoological Society, the Surinam toad (*Pipa Americana*), as the animal in question is called, was, we believe, only known in Europe by means of specimens preserved in spirit; and we have, therefore, been obliged to depend upon foreign observers for an account of its marvelous life-history. As it differs from other members of its order with

regard to its method of bringing up its family, so the Surinam toad is structurally more or less unlike all its kindred, constituting not only a genus but likewise a family group by itself. Externally it is characterized by its short and triangular head, which is furnished with a large flap of skin at each corner of the mouth, and has very minute eyes. The four front toes are quite free, and terminate in expanded star-like tips; but a large web unites the whole five toes of the hind foot. In any state the creature is by no means a beauty, but when the female is carrying her nursery about with her she is absolutely repulsive in appearance.

" It would seem that soon after the eggs are laid, they are taken up by the male and pressed, one by one, into the cells in the thickened skin of his partner's back; there they grow till they fit closely to the hexagonal form of their prisons, each of which is closed above by a kind of trap-door. After a period of some eighty-two days, the eggs reach their full development and produce, not tadpoles, but actually perfect little toads. The reason of this is that tadpoles, which require to breath the air dissolved in water by means of their external gills, could not exist in the cells, and, consequently, this stage of the development is passed through very rapidly within the egg. When ready to come forth, the young toads, which are usually from sixty to seventy in number, although there may sometimes be over a hundred, burst open the lids of their cells, and, after stretching forth their head or a limb, make their *début* in the world. Doubtless, glad to be free from her charge, the mother-toad thereupon rubs off what remains of the cells against any convenient

stone or plant-stem, and comes out in all the glory of a brand-new skin. During the non-breeding season these toads become much flattened, and seem to pass the whole of their time in water.

"The Surinam toad is, however, by no means the only South American representative of its order whose nursery arrangements are peculiar; a considerable number of frogs and toads from the warmer regions of the New World having ideas of their own as to the proper method of bringing up a young family. . . .

"According to a communication recently made by Dr. Geldi, of Rio de Janeiro, to the Zoölogical Society, the tree-frogs of the genus *Hyla*, inhabiting that part of Brazil, show considerable diversity in regard to nursing habits, although none of them has any part of its own body modified into a nursery. One species, for instance, builds nests of mud on the shallow borders of pools, wherein the eggs and tadpoles are protected from enemies; while another kind lays its eggs in a slimy mass attached to withered banana leaves, the young remaining in this nest until they have passed through the tadpole stage. In a third species, on the other hand, the larval stages are hurried through before hatching, the female carrying a load of eggs on her back, where they remain until developed into perfect frogs.

"The female of Darwin's frog (*Rhinoderma Darwini*), from Chile, has, however, 'gone one better' than all her allies; for, not only does she get her eggs and young safely carried about until they are fit to take care of themselves, but she has actually shifted the onerous task of taking care of them to her consort. Whereas there is nothing

remarkable about the structure of the female of this frog, the male has a capacious pouch underlying the whole of the lower surface of the body, which communicates with the exterior by means of a pair of apertures opening into the mouth on each side of the tongue. As soon as his partner has deposited her eggs, the male frog takes them in his front paws and transfers them to his mouth, whence they pass into the great nursing pouch, where they remain in perfect security till hatched into young frogs, which make their way into the world by the same passages."

SIAMESE FIGHTING FISH.

Two of these strange fishes are placed in the same bottle. They proceed to take each other's measure, shoulder up to each other in school-boy fashion, and back and push around the "ring," the small fins vibrating rapidly all the time, and each little being quivering with excitement and wrath. This goes on for some minutes, until, as the spectators are growing impatient, one fish suddenly flips his head around, makes a dart, and a considerable dent in his adversary's tail shows at once that he has got home. Henceforth there is no hesitation until one or the other cries, *peccavi*. In regular fish fights on which money depends, the battle is continued until one fish turns tail and is chased around the bottom by the other. But this is usually an affair of an hour, and frequently of three or four. The pluck and determination of the fighters are wonderful. The ordinary stream fish do not evince nearly so much as those that have been bred and reared for the purpose. The tail is the part which shows most damage, for it is very easily torn; but a good

grip on a side fin is more effective. When one pins the other by the nose a very exciting struggle takes place, the two lying fastened together like professional wrestlers, and then shaking each other backward and forward with might and main.

They often seem extremely exhausted, but still fight on bravely, and sometimes it is a matter of difficulty to part them. They display considerable agility in evading their opponent's mouth, and also in suddenly twisting around and taking a piece out of his tail. In twenty minutes or so these appendages, which looked so brave and bright as they went into the fray, are torn to ribbons. The fish's general appearance after the fight suggests that of a sailing ship emerging from a hot action, with her canvas hanging in streamers, her topmasts shot away, and her crew gasping for breath, but still ready to fight again. The combatants sometimes succumb to a long contest, but generally they only take superficial damage, and are immediately ready to feed. After a match they are always rested for a week or longer, according to the extent of their injuries, and most of the rents and cuts are repaired by nature. Enthusiastic owners often wager six or seven pounds or more on their favorites, and many people earn a little money in this way by breeding fighting fish and then backing them against others.—*London Field*.

We have often read of the Siamese fighting fish, and always thought that these fish resembled, as far as their mode of combat is concerned, the Chinese Paradise fish. We have never seen one of the former, nor have we a description regarding their size and color, but judging by the manner of combat as described in the above article, we are

almost certain that the Siamese fighting fish is no more nor less than the Chinese Paradise fish; at any rate, a fish belonging to the same species.—Ed. AQUARIUM.

SNAILS.

Regarding the strength of snails, a man of inquiring mind writes: One day, having found a fine specimen, I tied a fine cord around his shell after having fastened a bit of iron to the other end of the same, in order to keep him until I needed him. The iron was bigger than he was, and I supposed it heavy enough to hold him, until my attention was attracted by a dragging, scraping sound on the window-sill, where I had corralled my captive. This aroused my curiosity, and I determined to find out how much one snail could pull. I loosened the string from the bit of iron and made it fast to a letter scales, and watched Mr. Snail as he pulled the indicator around to very nearly nine ounces. Then I took a little match box, such as matches are bought in, put it on two pencils by way of wheels, and proceeded to hitch up my snail. I then loaded up my miniature cart with cents, and found he could still pull it to a weight of nine and a quarter ounces; that is, about twenty times his own weight, which was half an ounce.

A four year-old boy died this spring, poisoned by drinking water from a tumbler in which lilies of the valley had been kept. Few people have an idea how poisonous some flowers are, especially the lily of the valley, and it should be the rule in every house to keep cut flowers only in flower vases, and at no time to use tumblers for that purpose.

THE AQUARIUM.

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THE NEW YORK AQUARIUM.

Although the New York daily and Sunday press were, for the last two years, full of praises for this new institution, built by the city of New York, while it was yet in process of construction, giving startling accounts of its superiority over any public aquarium heretofore built in the world (which articles were promptly reprinted by the country press, illustrations and all), THE AQUARIUM (your Editor) had absolutely nothing to say regarding the work. We even refused to write it up for a magazine published in New York, as we could say nothing in its favor and did not care to criticise an unfinished job. The contracts had been given out; so what good could have been expected from calling attention to the defects in its construction? When the proper time had come, however, when our opinion was asked by the proper parties, we did not hesitate to give it frankly: "The plant will not work!" (Compare last issue of THE AQUARIUM.)

It startled the New Yorkers when they read it the following morning. The result is a good one. The ball was started to rolling; the scientific experts "found" in a similar sense, and the result was the resignation of the superintendent who had planned it and under whose direction it was built.

Dr. Tarleton H. Bean, who is now

in charge as the new superintendent, has been for many years connected with the U. S. Fish Commission and the Smithsonian Institution. He has considerable practical experience, and as an ichthyologist his reputation is a very flattering one.

As the aquarium had been constructed on wrong principles from the very start, several absolutely necessary changes are now being made. The entire lower row of tanks will be changed, in sizes as well as in their shapes; the roof will be raised some nine feet, to secure better circulation of air for the upper tanks, while two large storage tanks will be constructed for "resting" the water. This work will, in our opinion, take up the balance of this year, and we may not be able to see the New York Aquarium opened much before Christmas.

We shall keep our readers informed regarding the progress made, and when once completed we will have, regularly, illustrated articles treating of whatever may be of especial interest.

EXHIBITION AQUARIUMS.

In the last issue of THE AQUARIUM we spoke of shapes of aquariums principally intended for private use. In the following article we will show by examples how single tanks, or a series of them, are best arranged for public expositions.

From the twin aquarium for a school corridor, as described in the article referred to above, to the exposition aquarium, is but one step. The two main points to be kept in view when constructing a series of tanks for public use, aside from the proper location of them, of course, are: (1st) to secure proper protection to the collection against injury by spectators, caused

either through ignorance or by an in-born inclination for destructiveness ; and (2d) to allow ample elbow-room behind the tanks ("behind the scene" would be quite proper here) for the aquarist, that he may be able to work about, and arrange, the tanks and wait upon his charge at any time undisturbed.

We experienced sad losses when, many years ago, we first began to display

desired, and the policeman in charge of that part of the hall—why, he enjoyed it as much as the rest of them, and declared that the next time he would go out fishing, he would use that same kind of bait.

We knew, at least we thought so then, how to stop fishing and feeding our specimens. All that was required was a wire netting over the tanks. So we had these made with dispatch, and



A SECTION OF THE BERLIN AQUARIUM.

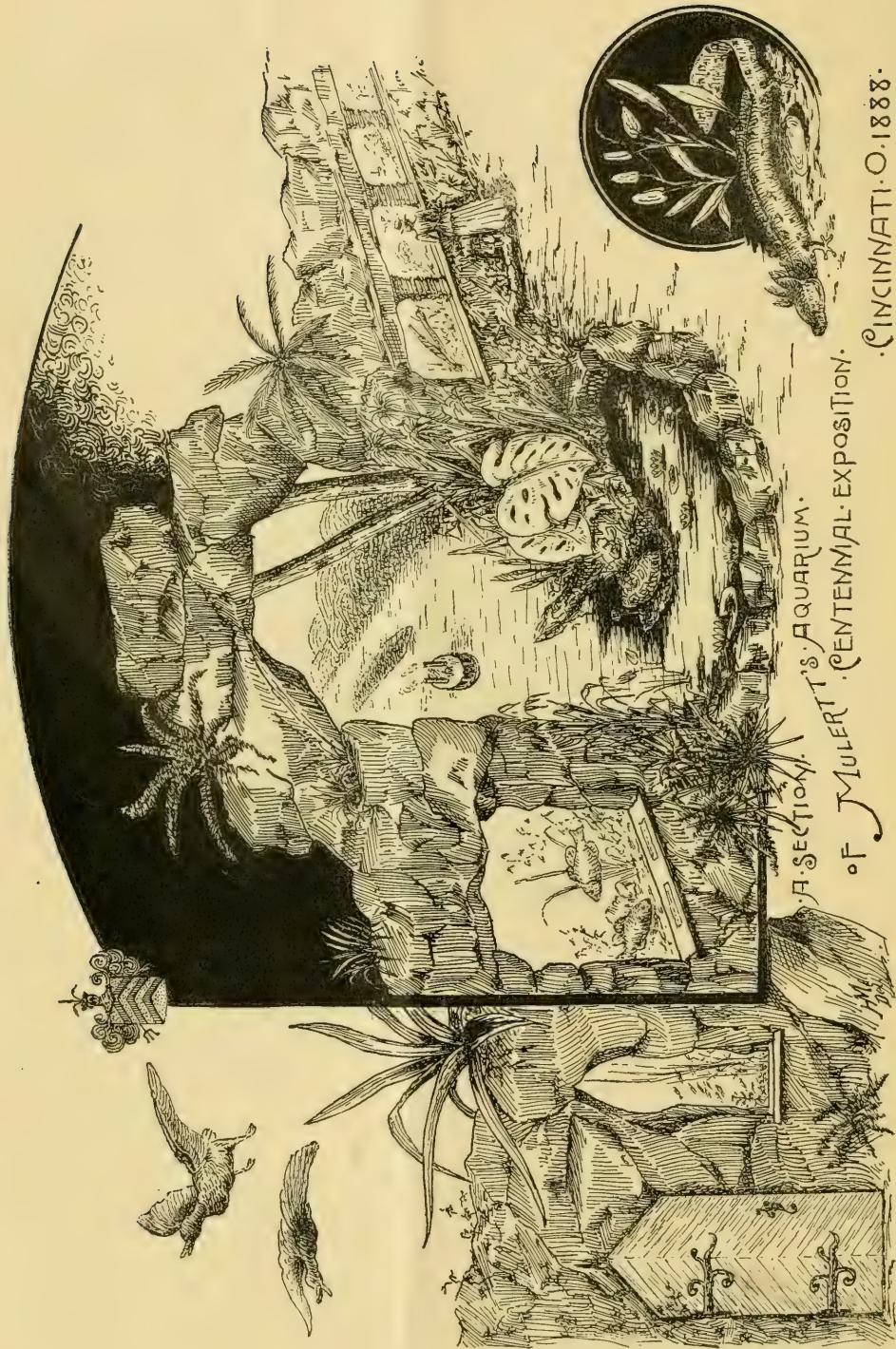
collections of aquatic life to the public. At first, when we innocently displayed our collection entirely unprotected, we mourned the loss of choice specimens that had been stolen. The water was frequently spoiled by people feeding the animals with almost anything possible and impossible, including preserved fruits and ice cream ; even the small boy with the proverbial "pin-hook" fastened to a thread, was represented. At one time a boy attracted quite a crowd around one of the aquariums, because he used a certain kind of bait that hooked nearly any fish he

when we covered our collection with them we felt that their safety was secured. But little did we know inquisitive man (we do not say woman). To look at an animal in captivity, no matter what element it is in, without at least trying to poke it, seems to be impossible for a great many people. The spectators would now poke their parasols or fan-handles through the screens, and when the mesh of the screens proved too small for these, some did not find it too much trouble to use their hat-pins for the purpose. It gave them so much pleasure when they hit

CINCINNATI, O. 1888.

A SECTION OF MULERT'S AQUARIUM.

OF THE CENTENNIAL EXPOSITION.



them "right close to the eye." The feeding-fiend misunderstood the meaning of the screens entirely. Of course, no one but "city folks" could think of preventing these dear little fishes from partaking of their luncheon—consisting principally of home-made pie. They would go to the trouble of breaking it into sufficiently small pieces and force it through the meshes. Two young ladies we will never forget, as we caught them in the act, busily engaged, both on the same tank, feeding the fish with sponge cake, using the protective (?) screen for a grater. Good-natured and polite, we stopped their proceedings, and were informed by them that we need not fear any bad effects, because they had baked the cake themselves, it being no "bought stuff." We had no doubt as to the quality of the cake, for the fish had literally filled themselves up with it; and we were compelled to renew the water of this tank at once. If we inform you that the tank held a barrelful, you can measure our appreciation of home-made Kentucky sponge cake. These few examples were caused by sweet innocence; but when one drops a box of sulphur matches, chewing tobacco, and, in one case, a chunk of unslaked lime (which he had to bring from outside the exposition grounds), into a tank, or cuts the glass with the diamond of a ring, we think it is done with bad intent.

On another occasion we had our display guarded by iron railings, made of gas pipe. It is true this kept the observer at a safer distance, but it likewise made the display less interesting, especially to the younger generation. On succeeding occasions we displayed our collection in show-window fashion. This arrangement guarantees entire satisfaction, both to the exhibitor and

the observer. We used this method first in 1879, and it has shown that it covers all wants.

In order to obtain the most striking effects, the tanks should be in convenient height to the eyes of the observer; the shape of the tanks should be long, rather than high, with sufficient depth (toward the rear) to admit the formation of a proper background.

The all important light is controlled by adjustable screens. Very beautiful



CAVE OR UNDERGROUND AQUARIUM.

effects can thus be secured with either daylight or artificial light. For lighting up the tanks at dark, the light should enter the water from above the surface of the water, and as much from the front as possible, keeping it (the light itself) out of the spectator's view. The outside space, the walk or passage in which the observer is, should be but dimly lighted, if lighted at all. The effect that is produced in this way is somewhat similar to that produced by a small bull's-eye lantern fastened in front of your hat. There will be no shadow between you and the object you desire to observe.

The accompanying sketch of one of our aquatic displays will give the reader

a pretty clear illustration of this method. The figure in the distance shows the comparative height and size of the tanks.

As will be seen, only the front of each tank faces the observer. He can see all that should be seen and is absolutely prevented from injuring the contents. The display in such tanks can be made very effective, it being possible to arrange everything in proper focus.

The screen or protective wall of a series of such tanks may be of any design. In connection with a floral display we found a rustic design best. A cave-like or underground arrangement is also very beautiful. The famous Berlin Aquarium is built on that principle altogether.

FANGS OF SERPENTS.

The venomous serpents are divided into two groups; namely, *Solenoglypha*, including the rattlesnakes, vipers, etc., and *Proteroglypha*, embracing the cobras, coral or bead snake (*Elaps*) and venomous water snakes of the East (*Hydrophidæ*). Fortunately, harmless serpents are, throughout the world, by far the most numerous. In the States north of Maryland, there are only two species of poisoned-fanged serpents (the rattlesnake and copperhead), while the non-venomous number eighteen species.

The fangs of serpents vary in number, shape and size. In the viper (*Pelias berus*), the only venomous one of the three species of serpents found in Great Britain, the fangs are two in number, and are situated in the superior maxillary bones. There are no other teeth in the maxillæ, but there is a row of small teeth in the palatine bone on each side. The bite of the

viper is often extremely painful, but rarely, if ever, fatal. The viper is not found in the United States.

I remember on one occasion, in Maryland, a gentleman conducted me to a wood to show me a "viper" he had a short time before killed, and gravely informed me that it was an "extremely dangerous species." It, however, proved to be a harmless hog-nose snake (*Heterodon platyrhinus*).

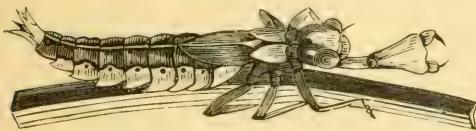
The fangs of the rattlesnake (*Crotalus*) are also two in number, situated as in the viper. They are curved backward, and hollow, save at the tips, where they are solid, and turned slightly forward. The minute opening through which the venom is ejected is in front, about one twelfth of an inch from the needle-like point. The glands in which the venom is secreted, are oval and almond-shaped, two in number, situated on either side of the upper jaw, behind the eye. Each gland has a duct connecting with the base of its fang. These poison ducts are kept closed by an arrangement of muscular fibres when the fangs are not in use, but at the moment when the snake strikes, these ducts are forced open by certain muscles of the head, and the poison shoots through the ducts and out of the openings near the points of the fangs into the wound. When not in use the fangs lie upon the gums in the roof of the mouth, buried in the folds of the mucous membrane.

The deadly machuca of Nicaragua (*Bothrops atrox*) has four great fangs in the upper jaw, two on each side. In view of the serious results which have followed the bite of our *Crotalus* and moccasin armed with only two fangs, how much more deadly must be the machuca, driving venom into four wounds at once!

The beautiful harlequin or bead snakes (*Elapidae*) are provided with two or more nearly permanently erect, grooved fangs in the upper jaw. These are generally small, not greatly curved and project only slightly below the nasal membrane. The poison glands of our Southern species of *Elaps* are small when compared with the above-mentioned serpents. They are generally considered harmless snakes.

DRAGON FLIES.

"Dragon flies," "mosquito hawks," "devil darning-needles"—these are some of the curious names for certain well-known neuropterous insects of the family *Libellulidae*. They are commonly seen skimming in swift flight over the surfaces of ponds and other bodies of still water. The head and thorax are greatly enlarged—the eyes entirely covering the sides of the former—and



LARVÆ OF DRAGON FLY.

the hind body is very long and slender, terminating in the male with a pair of clasps, for seizing the female. The two pairs of wings are nearly equal in size, transparent, and finely netted, and in many species clouded with broad bands of brown, blue, or crimson. The flies attach their eggs to the submerged leaves of aquatic plants, or drop them carelessly upon the surface of the water.

The larvæ are aquatic, living at the bottom of the pool or stream they inhabit, and breathing by means of *tracheæ*, situated in the tail. They are further characterized by what is known as a "mask," which is an elbowed extension of the *labium*, or under lip, and

is armed at the extremity with two sharp hooks for seizing and holding the prey. When not in use, this apparatus is folded up over the lower part of the face, but, to grasp a victim, may be suddenly thrust forward.

These dragon fly larvæ feed upon young mosquitoes or "wrigglers," and other aquatic insects, particularly the young of May flies (*Ephemeridæ*). They are active and predacious, in the pupa as well as in the larva and perfect states. When about to change into a fly, the pupa leaves the water and crawls upon some plant or other object above the surface of the water. After clinging there a short time a rent appears on the top of the thorax, through which the fly emerges.

AMERICAN LOTUS.

(*Nelumbium luteum.*)

The Lotus is America's greatest floral giant, even surpassing its terrestrial cousin, the stately magnolia, in size of flower, delicacy of coloring and profusion of bloom. It was a favorite plant with the aborigines, and was said by them to be the oldest child of the great "Father of Waters." The seeds were used extensively for beads, and were used as an article of food under the name "yonker pins." It was carried northward to Indiana and Illinois, and even as far as New York and Massachusetts. Great thickets of them were in cultivation on the middle waters of the Tennessee and Cumberland rivers at the time of the settlement by the whites. The oldest citizens now living in those sections can remember when the Indians would come and gather all the seeds they could carry away; and some think the roots were also used for food by some tribes. The Indian's arrow is modeled almost exactly after the long flower spikes, while his war club is a crude imitation of the large torus; so that while the Lotus of the sacred Nile had its worshipers, and the Lotus of the sacred Ganges its votaries and pupils, the lotus of the sacred Mississippi had, at least, its admirers.

G. B. M.

Drift-Wood.

WHY THE JELLYFISH HAS NO BONES.—Every admirer of Japanese art is familiar with the peculiar attitudes in which the artist has represented the objects he used for decorative purposes. The Japanese is a great lover and accurate observer of Nature. He uses both the animal and vegetable kingdom with great success in decoration. Only a very few scenes represented on bronzes, porcelain or in embroidery, etc., are understood by our people, and this is because their literature and legends are as yet but very little known.

As little as the Japanese would understand the meaning of a bronze bass-relief representing the awakening of Rip van Winkle, or the descent of the Indian maiden over the falls of the Niagara, or pictures illustrating the Song of Hiawatha, just as strange in appearance are those decorations to us that illustrate their legends, fables or history. Our admiration for their works of art is based principally upon their artistic merits in regard to color-effects or forms.

From a little booklet entitled "The Silly Jellyfish: a Japanese Fairy Tale," which we picked up in one of the Japanese stores of this city, we abstract the following:

"The king of the dragons, who had lived for a long time as a bachelor, decided to get married. His bride was a young dragonne, just sixteen years old and very lovely. All the fishes, great and small, came to pay their respects to their queen. But before long the young queen became quite ill. The doctors had given her up, when the queen expressed the wish to eat a live monkey's liver, which she knew would certainly cure her.

"A live monkey was very hard to obtain, as dragons live in the sea; and her husband told her so. But she cried, and finally said that she wished she had staid at home with her own mamma and papa. This, of course, startled her husband. He at once ordered his servant, a jellyfish, to swim across the sea to the monkey land and induce one of these creatures to come with him.

"In those days jellyfish had bones, eyes, fins, and even little legs to enable them to crawl about on shore. It did not take this

fish many hours until he had reached the shore where he knew monkeys could be met, and luck favored him, as he met one on a tree close by the sea.

"It was not very hard to induce the inquisitive monkey to go back with him to see the wonderful dragon land. While the jellyfish swam across the sea again, carrying the monkey on his back, thought came to the latter that not everything might be right. He could not see why an entire stranger should do or promise him any favors when he had no object in view. He thereupon cutely turned the conversation and learned that his liver was needed for the sick dragon queen. 'Why didn't you tell me so before?' he replied, 'as nothing would suit me better than to be of service to your queen. I would in that case have taken my liver with me. Our liver being rather heavy, we monkeys hang it up in the top of a tree when we are playing, and I see no other way than to go back and get it.' A monkey without a liver being of no use to the jellyfish, he was obliged to swim back to the land. When the monkey had reached the shore again he climbed into a large tree and advised the jellyfish to return without him.

"On his return to the king the jellyfish told what had happened, and this silly action made the king so mad that he ordered him whipped until all the bones within his body were broken. And this is the reason, according to the Japanese legend, why jellyfish have no bones."

We remember having seen a large bronze tablet showing a monkey on a tree making motions toward a fish in the water. This, no doubt, alludes to that "confidence game" between the jellyfish and the monkey.

DANGEROUS BOUQUETS.—A lady of Macon, Georgia, was arranging a beautiful floral design as a tribute to be laid upon the casket containing a departed friend. In selecting the leaves from the plant euphorbia, the stem producing them was broken, when a drop of sap was spattered into her eye. Inflammation immediately followed, which extended down her cheek, and her hands, which wiped away the tears from her eyes, were similarly affected.



For the small sum of fifty cents in advance, which pays for a year's subscription to THE AQUARIUM, you are entitled to ask information on any point regarding the aquarium or the window garden. We offer no other premium to our subscribers than that of putting over 25 years of practical experience in these branches at their disposal. Ask as many questions as you please, but please to enclose postage for reply. All questions are answered by mail, and we publish only such in these columns as are of general interest.

Will correspondents of this department please co-operate with us by reporting to the Editor the results obtained from advice given in these columns? Such information would be a great benefit to others in want of similar information.

C. K.—B.—Aquarium plants should be planted on the same principle as one plants garden plants, but they should be handled very carefully in order not to break or bruise them. Remove all water from the tank, leaving only the sand on the bottom, which should cover the latter to a depth of $1\frac{1}{2}$ to 2 inches. In this you make little dents, large enough to admit spreading of the roots of the plants, and these—the roots—you cover carefully and well with wet sand, finally covering the latter with a few pebbles of the size of a walnut. This done, the tank may be refilled with water.

The answer to the question, how often the water should be changed in an aquarium, is a very simple one: *As often as it becomes necessary.* How frequent this will be depends on:

1. The number of fish contained in the tank.
2. Their size.
3. Their kinds.
4. Season of the year.

5. Position (location) of the tank and its surroundings:

- a. The temperature of the room.
- b. The use made of this.
- c. What exposure.
- d. How far from the window.

You will see that your question requires an, apparently, complicated answer, which, however, may be condensed in the following:

The best light for an aquarium is a northern or eastern exposure. An aquarium should have as much light as possible, but *no sun*, in order to encourage the growth of the plants. Fish should be regularly fed, but *all unconsumed food* at once removed from the water.

If the air in the room is pure, and the fish come to and remain near the surface of the water, gasping atmospheric air, it indicates that they suffer from want of oxygen. Some fish must be removed from the tank in such a case, or, more or different kinds of plants must be introduced to the collection.

If it becomes necessary to change the water of an aquarium at all, it proves that the principles indicated above are not understood, or are overlooked.

To manage an aquarium successfully is not at all hard, but it will take some time and experience for anyone to study the "why's" and "what-for's," but just this fact makes an aquarium so interesting, and removes it out of the "toy" sphere.

A. E. S.—The disease you describe in your letter is a new one to us. It may have been caused by over-feeding, or impure water. Too frequent meat diet is very injurious to goldfish, and frequently is the cause of bloody streaks or spots in their fins.

As with all diseases, it is a great deal easier to prevent them than it is to cure them. Keep your fish, sick or not sick, under proper conditions, and disease will be an unknown guest to you. In a special case, as the one described in your letter, we would leave the fish in healthy surroundings, isolated of course, to its fate. This treatment has many points in its favor.

G. A. S.—Aquarium plants grow best in sharp river or sea sand. Soil is too unclean

for an aquarium, causing a great deal of annoyance.

It is not necessary to remove the parent Paradise fish from their young, until the second brood is about a week old. If the tank is well supplied with plants, and gets a good light, it is not necessary to feed the young until they have attained the size of a grain of wheat. Then they should receive several meals a day of powdered I. X. L. fish-food.

DR. B.—The reason why your Sagittaria New Era has not yet bloomed may be that it hasn't a good light. You know, we suppose, that if you want to have a pot-plant in bloom, it is necessary to give it a position where it gets plenty of light. It is the same with aquarium plants. However, it is not necessary that an aquarium plant should bloom in order to be of special benefit to the aquarium. This benefit can only be of an ornamental character. On the contrary, when the plant is in bloom, it uses most, if not all, its strength to perfect the flower and to ripen the seeds at the expense of the foliage and side branches, which are really the most important parts of the plant when used as an oxygenator. If one has plenty of vegetation in his aquarium, he should encourage some of his plants to bloom; otherwise, not, for reasons given above.

The male Paradise fish kills the female by biting. They torment them sometimes terribly, tearing off whole pieces of skin, with scales attached, or by picking out their eyes. In such cases they are best separated for good, as something seems to be about the female which he abhors. It is safest when mating a new set, to provide plenty of shelter for the female. In all our experience we have lost but one female, and this was many years ago, ere we had learned to protect them.

P. W. A.—There is nothing serious the matter with your goldfish. That "stringy scum, white in appearance" that leaves the fish, is caused by the character of the food you use. Feed some I. X. L. fish food to them, or occasionally treat them with small pieces of young earth-worms. The white spots on the fins of the fish may be a white worm, or colonies of tiny worm-like crea-

tures. Examine these spots with a magnifying glass, and if you find the former to be the case, these can easily be removed with the aid of a microscopic forceps, or, if the latter be the cause, by touching the spots with a camel-hair brush dipped in strong salt water.

To perform an operation of this kind, the fish is best removed from the aquarium and placed in a shallow dish of water, for instance, in a white soup-plate. Everything necessary for the operation should be in readiness before removing the fish from the tank, in order to inconvenience the fish as little as possible. The operation performed, the fish should be gently returned to the aquarium.

J. G. E.—The reason why your goldfish have not yet spawned may be the long winter we have had this year, which has so weakened some of the fish, that some time is required to bring them in condition to spawn. If you could feed them on living food, such as flea-crabs, mosquito larvae, crushed young snails, etc., this would help them along.

The destruction to the sod and shrubbery in Central Park, New York, since the lawns were thrown open to the public has been so great that the Park Commissioners have been compelled to replace the signs, "Keep off the grass."

This number completes Vol. III. of THE AQUARIUM. We are pleased to state that the favor with which our little publication is received by the reading public is a flattering one, every mail adding new subscribers to our list.

The first number of Vol. IV. will have as a supplement the title page and index for Vol. III. Please renew your subscription promptly and secure this.

With many thanks to our patrons, we remain,

Respectfully,

YOUR EDITOR.

